

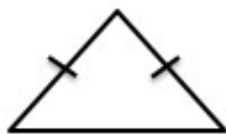
## (2) Angles in special quadrilaterals

Do now - find the acute angle between the minute and hour hands

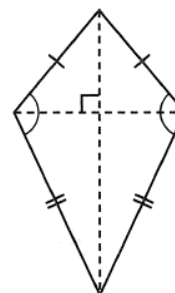
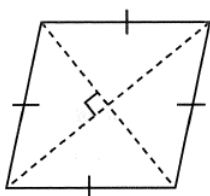
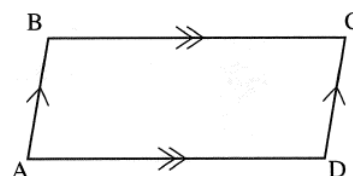
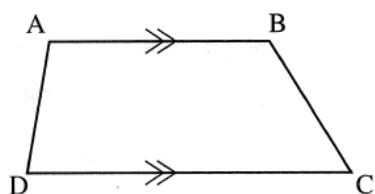
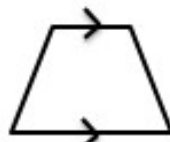
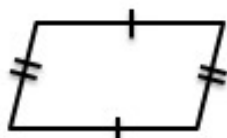
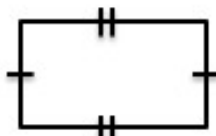
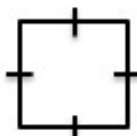
**A polygon is**

Sides:

3 {



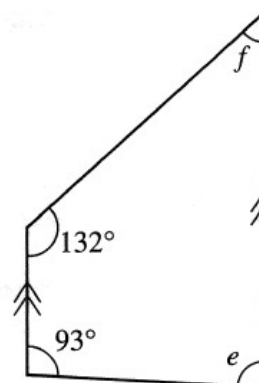
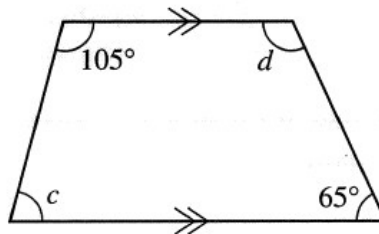
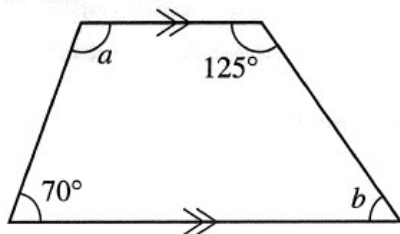
4 {



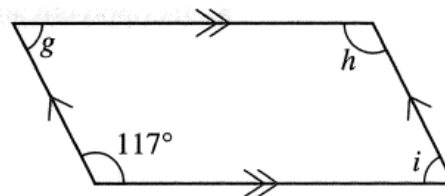
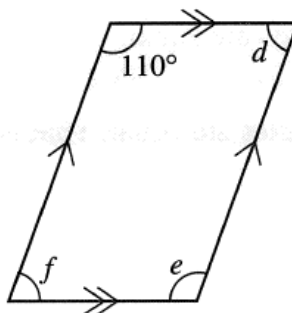
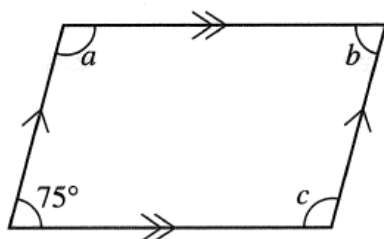
## Exercise



- 1 For each of these trapeziums, calculate the value of the lettered angles.

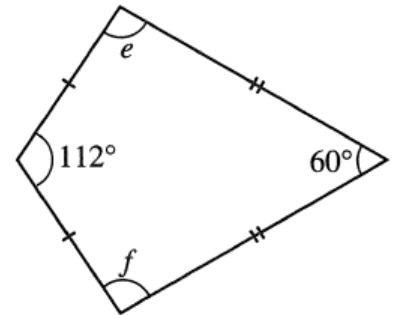
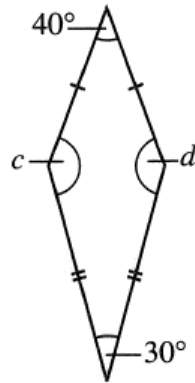
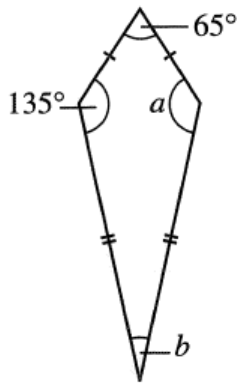


- 2 For each of these parallelograms, calculate the value of the lettered angles.

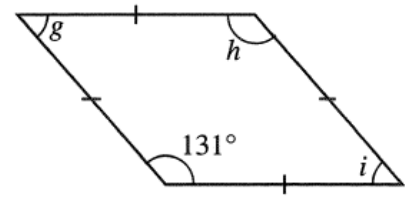
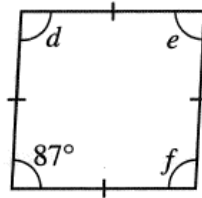
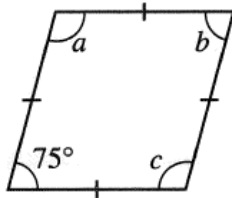




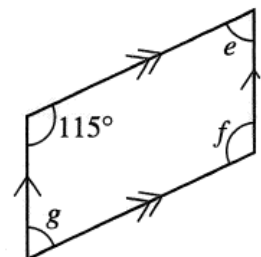
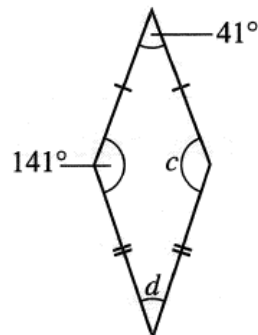
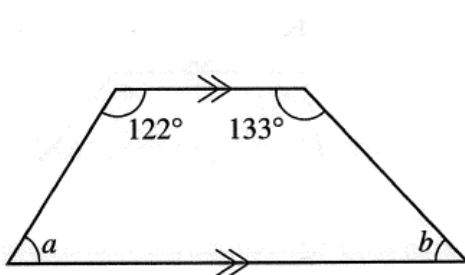
3 For each of these kites, calculate the value of the lettered angles.



4 For each of these rhombuses, calculate the value of the lettered angles.

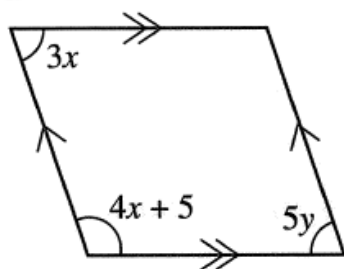


5 For each of these shapes, calculate the value of the lettered angles.

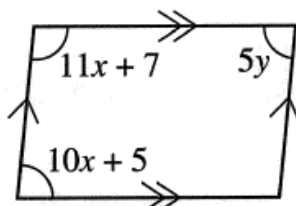


**6** Calculate the values of  $x$  and  $y$  in each of these parallelograms.

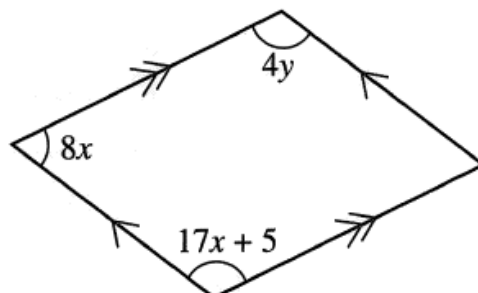
**a**



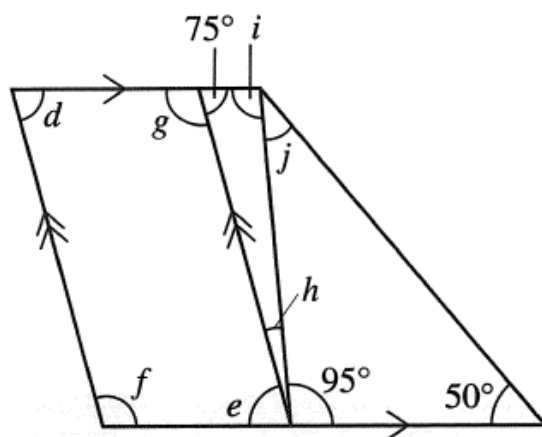
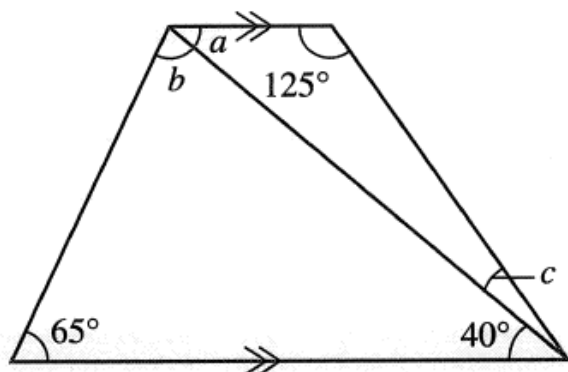
**b**



**c**

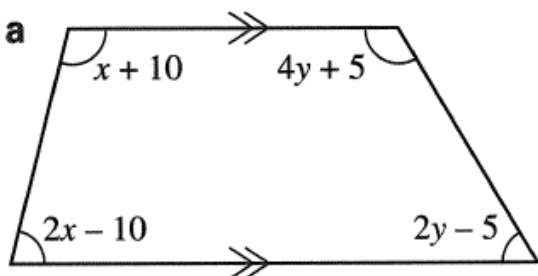


**7** For each of these shapes, calculate the value of the lettered angles.

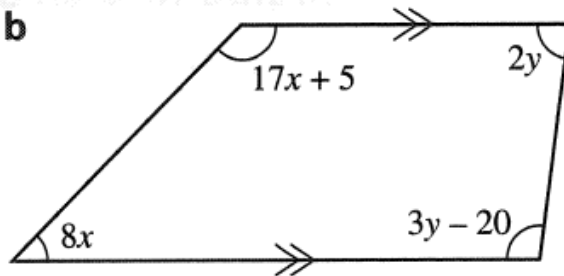


**8** Calculate the values of  $x$  and  $y$  in each of these trapeziums.

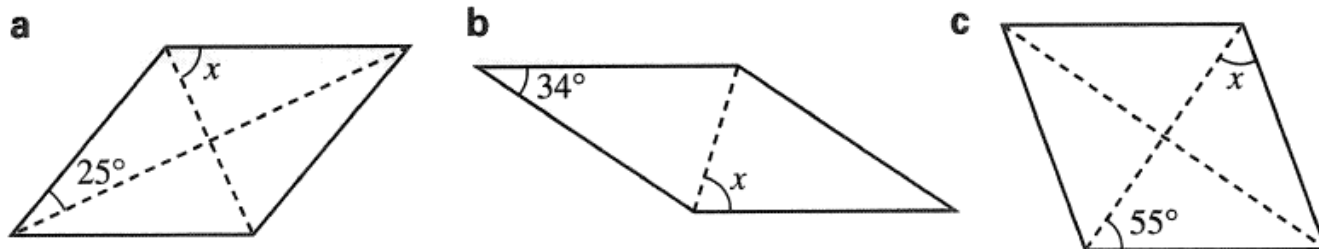
**a**



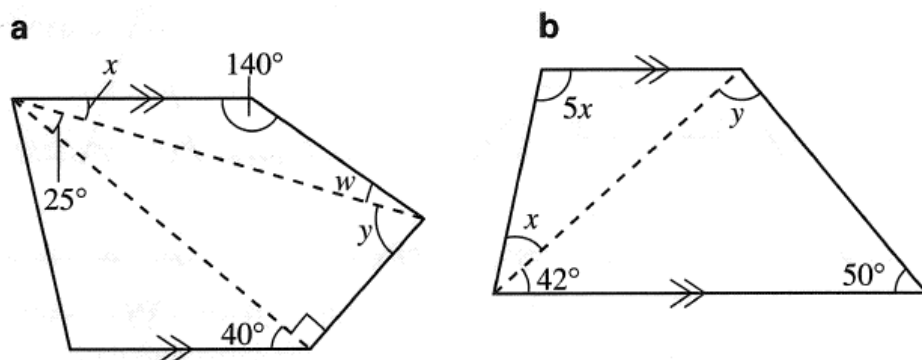
**b**



**9** Calculate the value of  $x$  in each of these rhombuses.



**10** Calculate the values of the letters in each of these shapes.

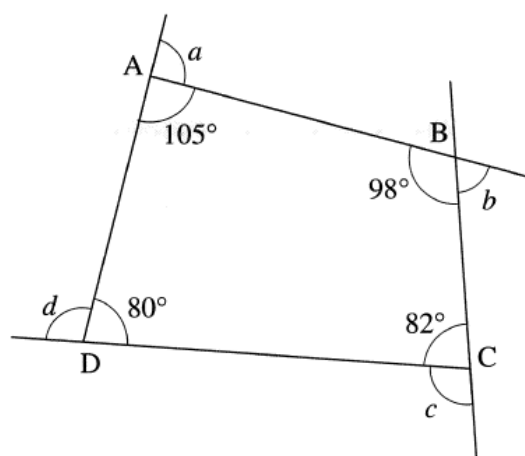


### Extension

**11** Find the value of  $x$  in each of these quadrilaterals and hence state the type of quadrilateral it is.

- a** One with angles  $x + 10$ ,  $x + 20$ ,  $2x + 20$ ,  $2x + 10$
- b** One with angles  $x - 10$ ,  $2x + 10$ ,  $x - 10$ ,  $2x + 10$
- c** One with angles  $x - 10$ ,  $2x$ ,  $5x - 10$ ,  $5x - 10$
- d** One with angles  $4x + 10$ ,  $5x - 10$ ,  $3x + 30$ ,  $2x + 50$

**! PROOF 12**



- a** The quadrilateral ABCD has interior angles  $100^\circ$ ,  $98^\circ$ ,  $82^\circ$  and  $80^\circ$ . Calculate the exterior angles (marked  $a$ ,  $b$ ,  $c$ ,  $d$ ) for each of the interior angles. What is the sum of the angles  $a$ ,  $b$ ,  $c$ ,  $d$ ?
- b** Prove that the sum of the exterior angles of any quadrilateral is  $360^\circ$ .